COURSE CODE	**GIE- 415**
COURSE NAME	**GPS SURVEYING**
CREDIT HOURS	Theory: 01
	Practical: 02
	Total: 03
CONTACT HOURS	Theory: 16
	Practical: 96
	Total: 112
PREREQUISITE	CE-182

MODE OF TEACHING:

Instruction:	Two hours of lecture per week	33%
Practical:	Three hours of Lab work per week	67%

COURSE DESCRIPTION:

This course is the follow up of Surveying-I in which students were taught basic surveying skills by doing most of the data acquisition with manual measurements.

In this course all the practical work is done by using the modern hardware and software. Field data is acquired and stored in the Total Stations and GNSS Receivers. It is downloaded in the computers in the lab and further processed by using computer software (Micro Survey CAD) The output, which is in the shape of maps, is plotted on colour plotters for field users.

COURSE OBJECTIVES:

To learn the principles and techniques of advanced surveying and carryout survey tasks by using modern survey instruments and software.

RELEVANT PROGRAM LEARNING OUTCOMES (PLOs):

The course is designed so that students will achieve the PLOs:

1	Engineering Knowledge:	☑	7	Environment and Sustainability:	☐

2	Problem Analysis:	☐	8	Ethics:	☐
3	Design/Development of Solutions:	☐	9	Individual and Team Work:	☑
4	Investigation:	☐	10	Communication:	☐
5	Modern Tool Usage:	☑	11	Project Management:	☐
6	The Engineer and Society:	☐	12	Lifelong Learning:	☐

COURSE LEARNING OUTCOMES:

On successful completion of this course, students will be able to:

No.	CLO	Domain	Taxonomy Level	PLO
1	Demonstrate advanced survey concepts for application to geo-informatics engineering.	Cognitive	3	1
2	Demonstrate efficiency in handling of advanced survey equipment.	Psychomotor	4	5
3	Commit to individual or group survey task as a leader or member expressing team spirit and inspiring conduct.	Affective	3	9

PRACTICAL APPLICATIONS:

- Modern survey instrument like Total Station and Digital Levels are frequently being used on all Civil Engineering sites now a day. Different survey software is also being used for processing survey field data. Therefore, our graduates will feel comfortable and confident with the present-day field environment after having learnt this course.
- At certain sites GNSS equipment is also available for fast acquisition of survey data. The familiarity of our graduates with this technology will enable them to use it efficiently.
- While executing a project spread over vast area, an engineer may be required to use many maps. Hence it is essential for the students to understand the National Mapping Grid System of the country. Topics like Geodesy and Map Projections are useful in this regard.

- Photogrammetry is a very fast method of surveying, and it can be used effectively when large survey work is required to be done in a short period of time.

TOPICS COVERED:

Theory:

Week	Topic
1	Introduction to modern surveying
2	Triangulation
3	Trigonometric levelling
4	Tachometry
5	Surveying using total station
6	Topographic mapping and alignment using total station
7-8	Introduction to Micro Survey CAD software and its use for different survey applications
9	GPS Surveys
10	Technological developments leading to GNSS
11	GNSS Constellation as control points
12	Trilateration using GPS (as a complex form of triangulation)
13	GPS signal structure (C/A and P-Code)
14	GPS Errors and biases
15	GRID I and GRID II for Pakistan
16	Setting out of works/*Linear regression models for survey dynamics mapping for error estimation.
17-18	**ESE**

Practicals:

No.	Topic
1	Triangulation.
2	Trigonometric Levelling.

3	Tachometry.
4	Mapping total station data
5	Demonstration and use of GPS simulator
6	Processing topographic mapping data on micro–Survey CAD Software.
7	Use of GNSS for static surveys
8	Use of GNSS in differential mode
9	Use of GNSS in RTK mode
10	Processing field data from GPS
11	Field data conversion to popular ESRI formats
12	Setting out of works.

TEXT AND MATERIAL:

Textbook (s):

a. GPS for land surveyors by Van Sickle, J., 2008.
b. Survey & Levelling by T.P. Kanetkar and S.V.Kulkarni (Vol -I & Vol -II)
c. Surveying Principles and Applications by Barry Kavanagh

Reference Material:

a. Survey for Engineers by John Uren & Bill Price

ASSESMENT SYSTEM:

1. CLOs Assessment

Cognitive	**Psychomotor**	**Affective**
Spreadsheet	Rubrics	Rubrics

2. Relative Grading

Theoretical/Instruction			33%
	Assignments10%		
	Quizzes10%		
	Mid Exams30%		
	End Semester Exam50%		
Practical Work			67%
Laboratory Work		70%	

	Laboratory Attendance20%		
	Laboratory Report20%		
	Laboratory Quiz30%		
Viva/Quiz		30%	
Total			**100%**